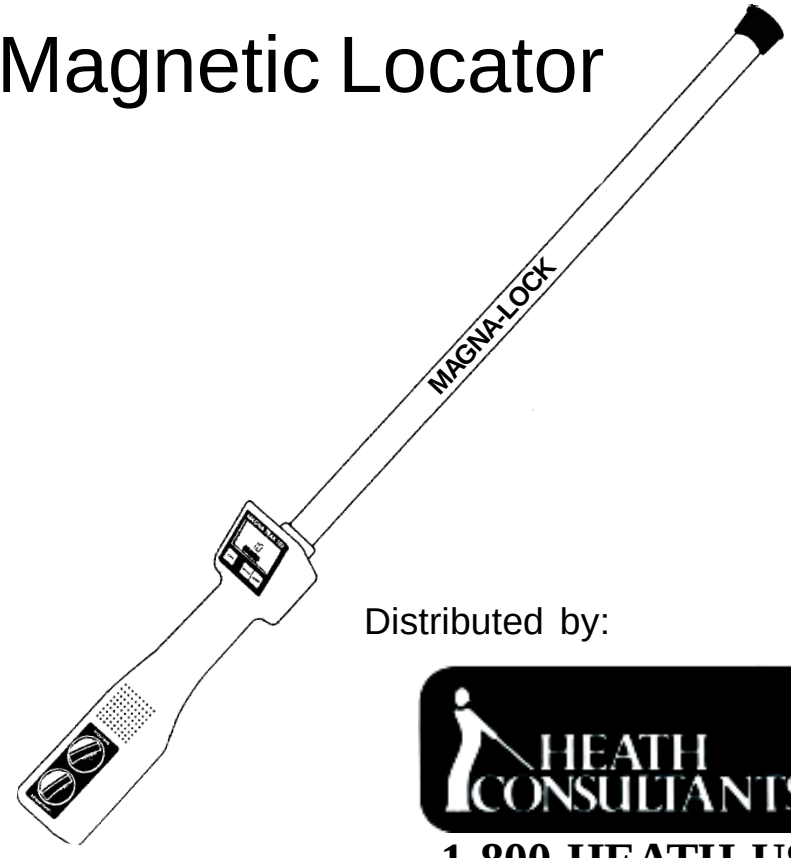
Owner's Instruction Manual

MAGNA-LOCK

Magnetic Locator



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Introduction

The Magna-Lock magnetic locator is a flux-gate type of magnetometer which incorporates a unique patented technology that enables the factory to balance the magnetic sensing coils to a finite condition. This patented method of magnetic balancing is more advanced in the state-of-the-art technology.

The Magna-Lock implements “peak response” over ferromagnetic objects by yielding on increasing audio signal as the object is approached and passed over.

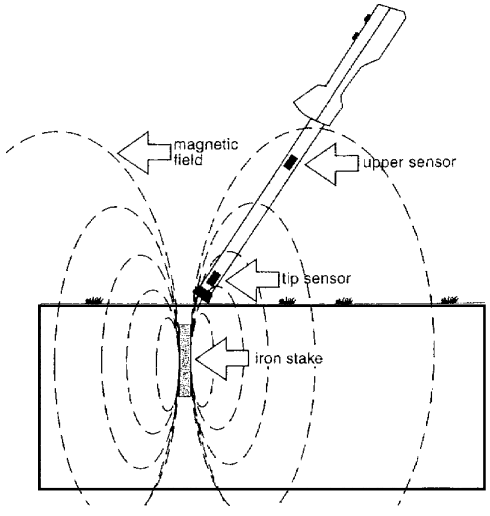
This instrument is distributed by Heath Consultants Incorporated. Heath Consultants Incorporated has over 65 years experience in the utility industry.

Theory of Operation

The Magna-Lock locator finds ferromagnetic objects by sensing the magnetic field radiated by the object. The locator contains two sensor coil assemblies that are precisely spaced and electronically balanced to achieve a near magnetic balanced operating condition. In a uniform magnetic field, such as the earth's field, the two sensor coils maintain a magnetic balanced status, because both of the coils experience the same magnetic lines of force. However, when a ferromagnetic object is approached the field strength and angle of the magnetic lines upon each sensor is different. This difference, although minute, is enough to offset the critical balance and produce an audible indicating signal.

When no ferromagnetic objects are present, the speaker emits a steady low frequency tone. As the object is approached, the audio frequency increases until the center of the object is directly beneath the locator's lower tip. The frequency peaks and then decreases as the object is passed. The peak indicates the exact location of the object.

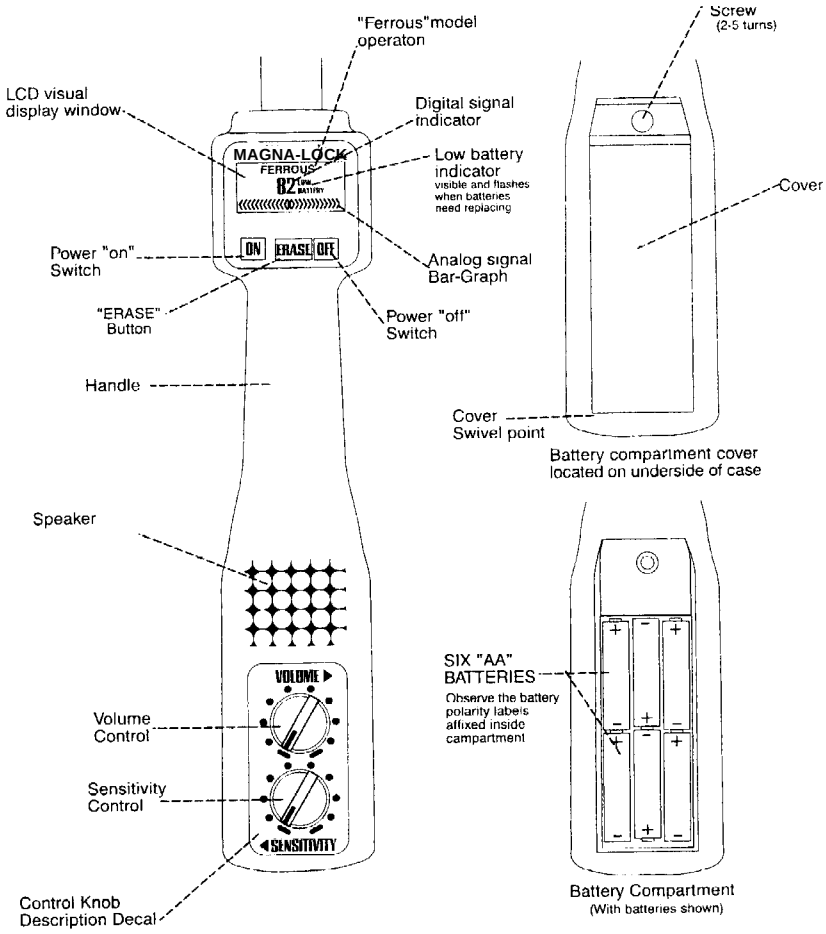
Nonferrous objects do not effect the locator. Objects made of brass, aluminum, copper, etc. are ignored.



Sensor coils unbalanced by iron stake's magnetic field.

Features

1. Instrument Control Panel
   a) LCD Visual Display
   b) Water-repellant push button switch operation
2. LCD Visual Display
   a) Two digit numeric signal indicator
   b) Expanding analog bar graph signal indicator
   c) “Low Battery” alert flashing indicator
   d) Displays “ferrous” model operation
   e) “Caution: Power Line” alert flashing indicator
3. Water-repellant push button operation, single action
   a) “ON” - power ON
   b) “OFF” - power OFF
   c) “ERASE” - Interferences such as a nearby fence are virtually erased allowing the signal to return to the normal audio tone.
4. Rugged high impact plastic enclosure with aluminum sensor pole.
5. Powerful magnetic speaker constructed with waterproof Mylar cone.
6. Six AA 1-1/2 volt battery operation.
7. 100 hour battery life under typical conditions.
8. Sensitivity control, single turn, continuously variable wide range depth adjustment.
9. Volume control, single turn continuously variable adjustment for selection of audio intensity.
10. Ergonomically designed for light weight, comfortable balance for easy handling.
11. Flip out battery compartment cover for easy battery access.
12. Signal “peaks” over magnetic objects.
13. Excellent depth capability.
14. Includes padded carrying case with shoulder strap or hard case.
15. Deep tone audio under search conditions.
16. Water-resistant construction


"Ferrous"model operaton
LCD visual display window
Digital signal indicator
MAGNA-LOCK
FERROUS
Low battery indicator
visible and flashes when batteries need replacing
Power "on" Switch
ON
ERASE
OFF
Analog signal Bar-Graph
"ERASE" Button
Power "off" Switch
Handle
Speaker
VOLUME
Volume Control
Sensitivity Control
SENSITIVITY
Control Knob Description Decal
Screw (2-5 turns)
Cover
Cover Swivel point
Battery compartment cover located on underside of case
SIX "AA" BATTERIES
Observe the battery polarity labels affixed inside campartment
Battery Compartment
(With batteries shown)

Basic Operation and Descriptions

Power On Button: Press once to activate the locator circuitry. Simultaneously, the circuitry is automatically set to the proper audio tone.

Power Off Button: Press once to turn the battery power off.

Volume Control: Rotate the knob to the desired audio sound level. Full volume is achieved when the knob is turned full clockwise.

Sensitivity Control: The sensitivity or depth range can be varied with the rotation of the sensitivity knob. Maximum range is provided at full clockwise rotation. The optimum setting is determined by each particular application. Areas crowded with various undesired ferrous metal may require a reduced sensitivity level. Deeply buried objects being searched will require the higher sensitivities.

Control Knob Decal: The markings for both the sensitivity and volume control knobs are provided as a reference for future settings or comparisons.

Speaker: When no magnetic metal is present the audio sound heard will be a low frequency tone. As ferrous metals are approached the audio tone will increase.

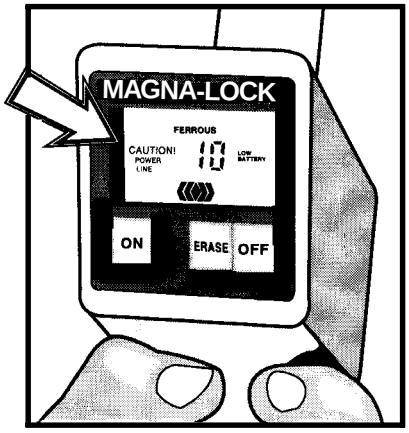
LCD Visual Display: Several visual display functions are provided for ease of operation as defined below.

Ferrous-Defines the basic function of the locator as a “ferrous locator” (fixed indicator).

Digital Signal Indicator- A two digit numeric display shows the relative signal level related to the audio signal response being heard from the speaker. At the lowest signal level when no magnetic metal is present a small number will be viewed between “0” and “5”: As metal is approached, the numbers will increase until “95-99” is viewed. Deeply buried objects or lower sensitivity levels will yield a lower peak number to aid in pinpointing.

Analog Bar-Graph Signal Indicator - the bar graph corresponds directly to audio frequency by expanding outward from the center “diamond” as the signal increases due to magnetic metals.

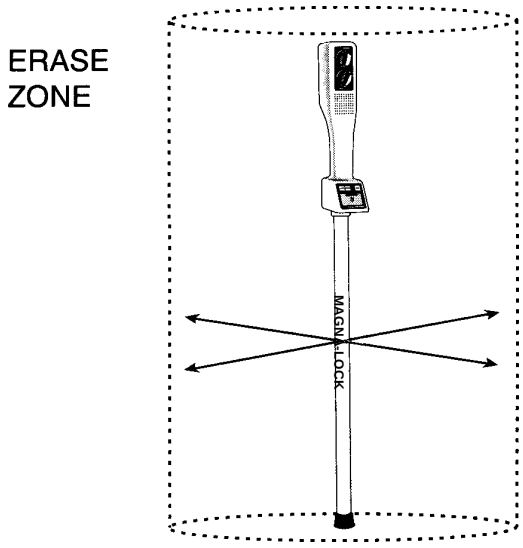
Low Battery Indicator - Although not visible under normal conditions the LCD will display a flashing “Low Battery” warning when the batteries fall below a predetermined voltage. This alerts you to replace the batteries soon. Several hours of battery life remains. However, in cold temperatures this usable time may be shorter.



Power Line Indicator Feature
The electro-magnetic fields radiated from buried or overhead power lines are picked up by the new sensitive electronic circuitry and internally transformed into a visually flashing indicator in the display window as shown:
The distance or detection range from the cables where the locator responds depends on the energy being carried by the electrical conductors. The higher the energy, the greater the distance the locator will respond to it. If the cables are dead (no electrical connection or energy transfer), then no visual indication will appear.

When the locator is turned ON, this feature is activated immediately. This feature only responds to 50 or 60Hz power line frequencies and not to telephone or TV cables. **This feature is intended as an aid only and not to be used for locating or pinpointing electrical cables.**

The magnetic detection operation and performance of the magnetic locator are completely independent from the power line indicator feature.



Erase Button: This is an optional button that is primarily used in locations where large metal objects normally interfere with the desired operation of magnetic locators. Cyclone fences, metal buildings, vehicles and other large magnetic objects can be electronically erased with this button.

The operation of this feature is best defined by explaining the typical locator without this feature. For example, typical magnetic locators will normally yield a screaming audio tone when they are being operated in close proximity to a metal fence. The magnetic field from this fence will usually override the signal being sought from the buried object in search of. The only option is to reduce the sensitivity until the interference from the fence is minimized. However, the locator's sensitivity to the buried object is also minimized and usually undetectable.

The new Magna-Lock and its "Erase" feature solves this problem by providing an Erase button; simply press this button when the interference is annoying and the metal structure is electronically erased. The audio tone returns to the "no metal" tone; the search continues and the buried object is located .

This erasing action is functional within a reasonable cir-

lar area around the position of the locator in which the erase button was pressed. This circular area, referred to as the erase zone, may be affected by the magnitude of the magnetic field of the fence and the distance from the fence when the button was pressed. In extreme cases, there may be a point where you may have to press the Erase button again as you approach the fence.

If you inadvertently erase the object you are directly over, simply move the locator to one side and activate the Erase button and return to a normal search procedure.

Battery Replacement: Turn the power off. Unscrew the thumb screw on the battery cover between 2-5 turns. Lift the cover off until the tab at the rear of cover clears the slot it is located in. Remove the batteries by raising the batteries at the junction or contact point of each set of two batteries. This is the point where the two batteries contact each other. You may prefer other methods of your choosing. Dispose of the weak batteries properly. Insert the new batteries observing the polarity markings located inside the battery wells. Install the cover in the reverse manner. Do not over tighten the thumb screw. Do not replace the batteries under raining conditions, whereby allowing water to enter the battery compartment.

Dead Batteries should be removed immediately-especially before storage of the locator. Dead batteries are prone to leakage and may potentially damage the locator.

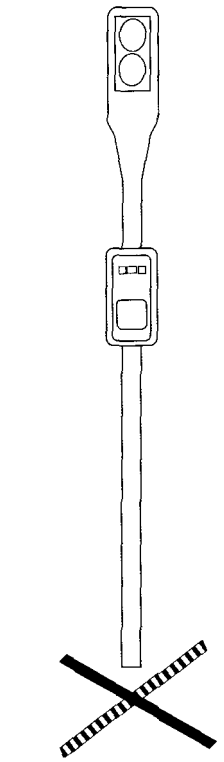
Replace all six batteries at once. Never selectively replace batteries.

In the event the "Low Battery" indicator is not displayed, no visual indications appear on the LCD window and no sound is heard after pressing the power ON Switch-the batteries may be completely dead. Check the battery compartment immediately.

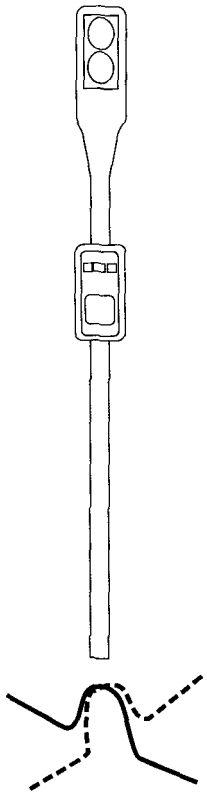
Personal Items: Your magnetic locator is not only sensitive to buried magnetic objects-it will also respond to items in your possession. Ferrous objects such as steel tipped shoes, a pocket knife, some wrist watches, key chains and other magnetic objects will cause false signals during your search.

Field Operation

The recommended search position is a 45 degree angle from the earth's surface. Scan the locator pole from side-to-side in a slow sweeping motion while walking in a uniform direction. Once the object being searched is located, pinpointing the objects location can be accomplished by holding the locator vertical and sweeping it in an "X" pattern until the absolute peak is found. Maintain a consistent height above the ground during the side-to-side sweeping motion. The audio sound and visual LCD display will provide the pinpointing results shown.



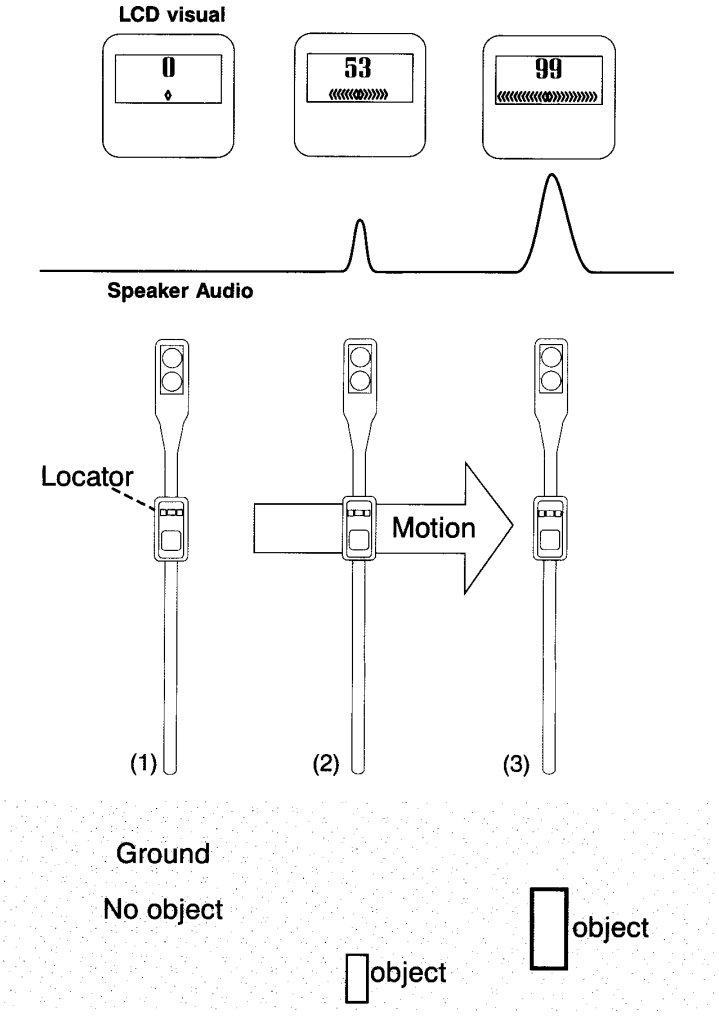
Physical "X" Motion Shown



Locator's Electrical response representation

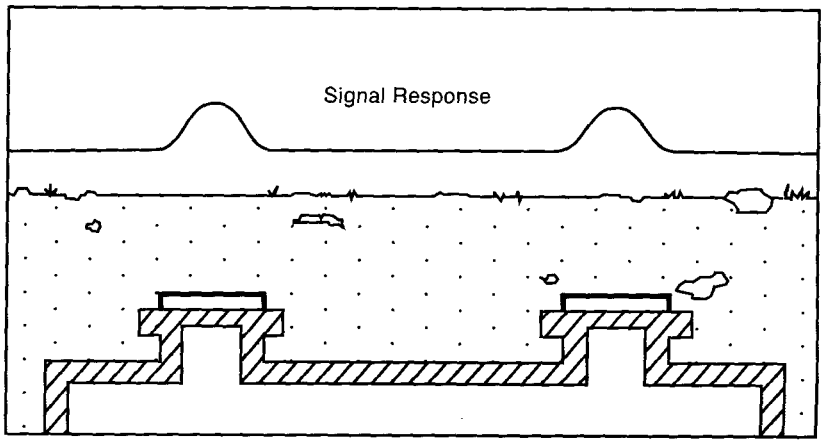
Signal Response

Below is an example of audio and LCD visual signal responses to (1) no object, (2) one small deeper metal target and (3) a second larger and shallower metal object. The LCD display indicates both the numeric digital and analog bargraph response as the locator passes over the ground.



Typical Signal Responses

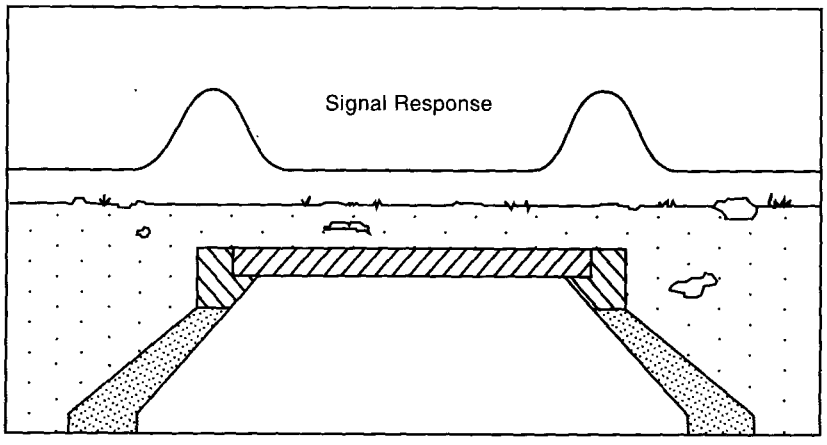
The metal handles on the septic tank cover will provide a usable signal to determine the location of the actual cover.



The metal handles on a septic tank cover

Large metal objects may cause double signals as indicated.

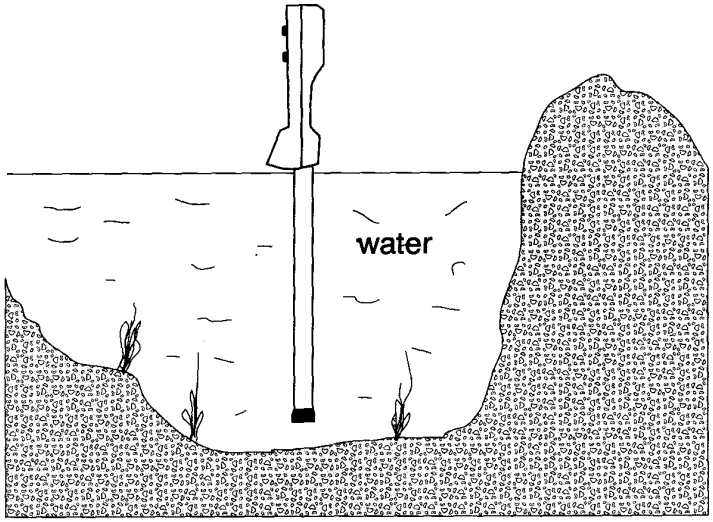
The center of the cover is found by sweeping the locator back and forth to create a ring pattern response. The center null will designate the cover's center.



Sewer cover

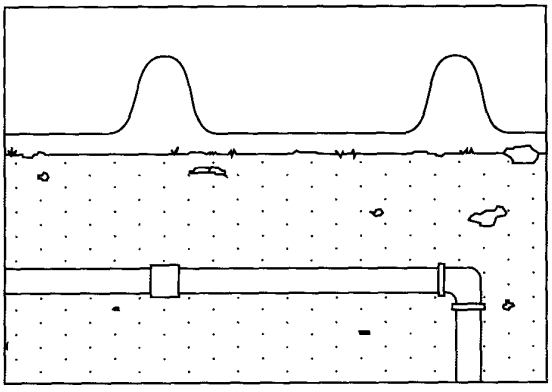
Typical Signal Responses

Water Locations:
The locator can be submerged into water with the pole section to just under the plastic case.



Hold the locator in a vertical position while searching to produce the best results.

The joints, elbows and ends will create the strongest signals.

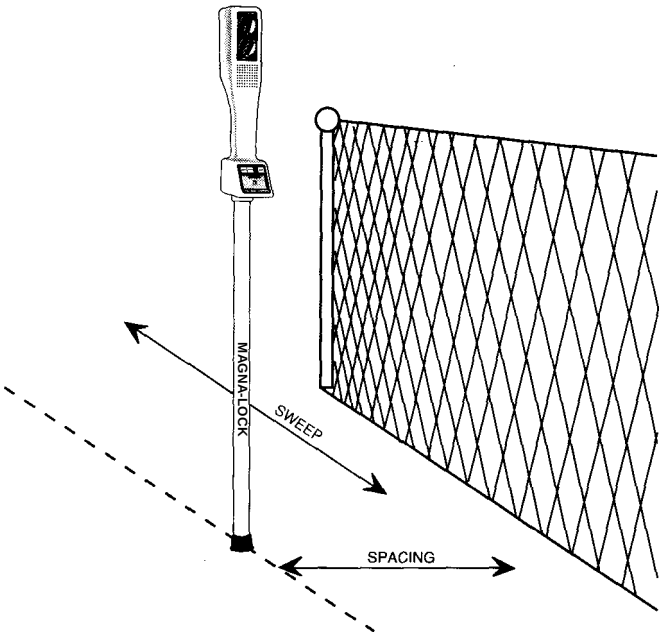


Cast iron pipe, joints, elbows, etc.

Locating Near a Steel Fence

Approach the fence and stop at the distance at which you wish to begin your search. While holding the locator in a vertical position, press and release the "erase" button on the membrane panel. Begin sweeping the locator side to side parallel to the fence. As you move toward or away from the fence during the sweeping motion, at some point you may have to press the "erase" button again.

Continue this process throughout the search. The need to reactivate the "erase" circuitry depends on the proximity from the fence and the magnetism of the fence itself.



Searching Under an Unattended Vehicle

In the event you must search under an parked vehicle that is unattended, you can simply slide the sensor pole under the vehicle and activate the "erase" feature. Slide the sensor pole side to side until you locate the target.

Specifications

Power: Six AA 1 1/2 volt batteries

Battery Life: 100 hours of intermittent operation (alkaline batteries)

Output: Powerful magnetic speaker with water proof Mylar cone.

LCD Display: Numeric digital, analog Bar-graph and low battery indicator feature.

Weight: Approximately 3 lbs. (1.3kg) with batteries.

Operating Temperature: 0°F to 120°F (-18°0 to 49°C).

Length: 40 inches (101.6 cm.).

Construction: High impact plastic, water resistant, light weight and epoxy painted. Aluminum sensor tube waterproof to just under the plastic case (see page 13).

Patent: United States #4,439,732.

Nominal Sensor: 20 inches (50.8 cm.).

Warranty

The Magna-Lock Magnetic Locator is warranted to be free from defects in materials and workmanship for a period of five years after the delivery of the product to the original user. Our liability under this warranty is limited to replacing any defective parts, adjusting and servicing any instrument or, at the company's option, replacement of the instrument returned by the original user, transportation charges prepaid, to the company. If the malfunction has been caused by misuse or abnormal conditions of operation, repairs will be billed to the user, with a cost estimate submitted prior to commencing repair work.

Batteries and the battery holder are not covered by this warranty.

Include model, serial number and a written description of the problem encountered with the instrument with the return of the locator.

All Magna-Lock locators repaired out of warranty carry a warranty on replaced parts for a period of 90 days.

Service

If your magnetic locator needs service, you may return it to Heath Consultants. Include your name, address, where purchased, date of purchase, and a description of the problem(s).

Corporate
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